

REMARKS

Entry and consideration of the foregoing Amendment along with the Amendment filed on January 17, 2003 are respectfully requested.

Upon entry of this Amendment, claims 1-8, 10, and 14-44 will be pending in this application.

The Applicant is appreciative of the courtesies extended by the Examiner to Applicant's representatives during the personal interview on January 28, 2003. In view of the issues discussed during the interview, Applicant's representatives indicated that a supplemental amendment would be filed.

Claims 1, 15, and 21 have been amended to further limit the subject matter recited in the claims. Applicant respectfully submits that neither Mori et al. nor Montcalm et al., taken alone or in combination, disclose, teach or suggest the subject matter recited in claims 1, 15, and 21.

Moreover, with regard to claim 20, Applicant submits that a sensor is "any device that receives a signal or stimulus (as heat or pressure or light or motion etc.) and responds to the signal or stimulus (syn: detector, sensing element)." The type and construction of a sensor used to measure a parameter of projection or illumination beams will depend on several factors, including the position of the sensor, the moment of measurement and the parameter being measured. For example, if the measurement is performed during normal operation of the apparatus, the sensor may not effect the beam it is measuring. On the other hand, if the measurement is performed between the normal operating cycles, the sensor may be allowed to effect the beam to some extent. In this context, two categories of sensors may be distinguished: (i) sensors that rely on an optical effect (that modify, direct, focus, shape, control etc. a beam). Examples of such sensors include, a radiation sensor that may be optimized by maximizing the amount of light absorbed at the sensor, or a sensor that may measure a physical effect caused by the interaction of a beam with an optical element (such as a reflector). (ii) sensors that do not rely on an optical effect. For example, a radiation sensor that measures a physical effect caused by the interaction of the beam with a wire.

The Applicant submits that the use of capping layers may be advantageous to both categories of sensor as the capping layers serve to stabilize the measurement accuracy over time. Consequently, the Applicant reiterates that Montcalm et al. is completely silent about providing a sensor with a surface covered with a capping layer, the capping layer formed of a

relatively inert material. In fact Montcalm et al. teaches away from a sensor by expressly making reference to producing "reflective coatings" such as capped multilayer mirrors (see for example col. 2, lines 34-35 in Montcalm). Thus, it is respectfully submitted that one of ordinary skill in the art would not have been motivated to use the reflective coating of Montcalm et al. in a sensor.

#### CONCLUSION

In view of the foregoing, the claims are now in form for allowance, and such action is hereby solicited. If any point remains in issue which the Examiner feels may be best resolved through a personal or telephone interview, he is kindly requested to contact the undersigned at the telephone number listed below.

Attached is a marked-up version of the changes made to the specification and claims by the current amendment. The attached Appendix is captioned **"Version with markings to show changes made"**.

All objections and rejections having been addressed, it is respectfully submitted that the present application is in a condition for allowance and a Notice to that effect is earnestly solicited.

Respectfully submitted,

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Enclosures: Appendix

**APPENDIX: VERSION WITH MARKINGS TO SHOW CHANGES MADE****IN THE CLAIMS**

The claims have been amended as shown below:

Please enter amended claims 1, 15, and 21 as follows:

1. (Four Times Amended) A lithographic projection apparatus, comprising:
  - an illumination system constructed and arranged to supply a projection beam of radiation;
  - a first object table provided with a first object holder constructed and arranged to hold a mask;
  - a second object table provided with a second object holder constructed and arranged to hold a substrate;
  - a projection system constructed and arranged to utilize said radiation to image an irradiated portion of the mask onto a target portion of the substrate; and
  - at least one of said illumination system and projection system having an optical element with a surface on which radiation is incident and a capping layer covering said surface, said capping layer being formed of a relatively inert material,
  - wherein said relatively inert material is selected from the group consisting of: diamond-like carbon, Ru, Rh, [B,] TiN, MgF<sub>2</sub>, LiF, C<sub>2</sub>F<sub>4</sub> and compounds and alloys thereof.
  
15. (Four Times Amended) A device manufacturing method using a lithographic apparatus, the method comprising:
  - providing a mask containing a pattern to a first object table;
  - providing a substrate at least partially covered by a layer of energy-sensitive material to a second object table; and
  - irradiating said mask and imaging irradiated portions of said pattern onto said substrate;
  - said irradiating comprising directing radiation onto a surface of an optical element, the surface having a capping layer formed of a relatively inert material,
  - wherein said relatively inert material is selected from the group consisting of: diamond-like carbon, Ru, Rh, [B,] TiN, MgF<sub>2</sub>, LiF, C<sub>2</sub>F<sub>4</sub> and compounds and alloys thereof.

21. (Twice Amended) The lithographic projection apparatus according to claim 20, wherein said relatively inert material is selected from the group consisting of: diamond-like carbon (C), [boron-nitride (BN), boron carbide ( $B_4C$ ), silicon nitride ( $Si_3N_4$ ), silicon carbide (SiC), B, Pd,] Ru, Rh, Au,  $MgF_2$ , LiF,  $C_2F_4$ , TiN and compounds and alloys thereof.

End of Appendix